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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,338	04/10/2006	Toshimichi Makii	2003JP323	1811
26289 7590 02/06/2008 AZ ELECTRONIC MATERIALS USA CORP. ATTENTION: INDUSTRIAL PROPERTY DEPT. 70 MEISTER AVENUE SOMERVILLE, NJ 08876			EXAMINER THOMPSON RUMMEL, PONDER N	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 02/06/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/575,338

Applicant(s)

MAKII ET AL.

ExaminerPONDER N. THOMPSON
RUMMEL**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-8,11,13-15 and 17-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8,11,13-15 and 17-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 4, 7, 11, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimori et al (US 6,207,343) in view of Kawata et al (5912102).

With respect to claims, Fujimori et al discloses a positive photosensitive composition comprising:

- A. An alkali soluble novolak (column 51, lines 9-11) in the amount no more than 50% by weight (column 51, lines 44-49);
- B. A compound which decomposes by the action of an acid to enhance its solubility in alkaline developing solution represented by formula (Ib) wherein W_b is a divalent organic group (column 7, lines 7-15) and R_{3b} is an alkyl group having 11 to 20 carbons (column 7, lines 16-25) and is the amount between 10-30% by weight of the total composition (column 49, lines 50-56);
- C. An acid generator in the amounts of 0.01 to 20% by weight (column 73, lines 20-29);
- D. A photosensitizing agent (column 76, lines 20-40)

E. An alkali soluble acrylic resin such as a hydroxystyrene and a copolymers of methacrylic acid esters (column 15 lines 32-43 and column 16, and lines 1-5) such as methyl methacrylate (column 79, lines 29-30) in amount from 5 to 30% (column 16, lines 7-12).

However, Fujimori et al fail to disclose the use of a photosensitizing agent (D) comprising a quinonediazide group within the resist composition.

Kawata et al. discloses a positive resist composition that comprises a phenolic resin (such as a condensation product of a phenol and aldehyde – column 3, lines 37-41) and a photosensitive agent that is composed of a quinonediazide sulfonate (column 4, lines 40-51) wherein the photosensitive agent is between 1-100 parts per weight and preferably 10-40 parts by weight with respect to 100 parts per weight of the phenolic resin (column 16, lines 53 –54). Too low of a concentration of the photosensitive agent will make it impossible to form a pattern and cause deterioration of resolution. A concentration that is too high will bring about the deterioration of thermal flow resistance (column 16, lines 57-59). Further, the use of quinonediazides with novolaks resins increase the resolution and enhance the performance and development of patterns (column 1, lines 42-55).

Therefore, it would have been obvious to one of ordinary skill within the art at the time of the invention to include a photosensitive agent as

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disclosed by Kawata et al. within the composition of Iwanaga et al. to enhance pattern formation and to prevent deterioration of the resolution.

3. Claims 6, 13, 14, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimori et al (US 6,207,343) in view of Kawata et al. (US Patent 5,912,102) as applied to claims 1, 3, 4, 7, 11, 17 and 18 above, and further in view of Nitta et al (U.S. 2002/0045130).

With respect to claims 6, 13, 14, 18 and 20, Fujimori et al. in view of Kawata et al. discloses the composition of claim 6 wherein the amounts of said components A, B, C D and E are stated above. However, Iwanaga et al. nor Kawata et al. to discloses the use of a compound comprising at least two vinyloxyalkylester groups within the resist.

Nitta et al. discloses a positive-working photoresist composition that comprises a crosslinking polyvinyloxy compound that serves to effect thermal crosslinking with a resin in the formation of the photoresist layer (paragraph [0034]. The use of the polyvinyloxy (vinyl ether group) within a photoresist composition produces a patterned resist layer with high pattern resolution and resistance against dry etching (paragraph [0005]).

It would have been obvious to one of ordinary skill within the art at the time of the invention to include the use of a vinyloxyalkyl ester as disclosed by Nitta et al. within the composition Iwanaga et al. and Kawata et al. to further enhance pattern resolution and resistance against dry etching.

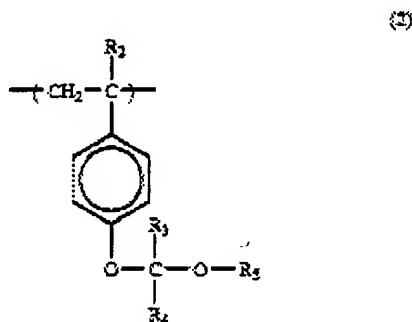
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4. Claims 5, 15, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimori et al (US 6,207,343) in view of Kawata et al. (US Patent 5,912,102) and in view of Nitta et al (U.S. 2002/0045130) as applied to claims 1, 3, 4, 6, 7, 11, 13, 14, 17 and 18 and 20 above, and further in view of Iwanaga et al (US 5,962,180).

With respect to claim 5, Fujimori et al in view of Kawata et al discloses the photoresist composition as applied to claim 1 above along with the use of a polyvinylloxy compound of Nitta et al, but fails to disclose the use of a hydroxyalkylmethacrylate.

Iwanaga et al discloses a radiation sensitive composition comprising:

- A. A polycondensation resin of at least a phenol and aldehyde
(novolak – column 10, lines 64-66) in the amount of no more than
200 parts by weight (column 11, lines 10-13);
- B. An acetal copolymer of formula 2 (column 2, lines 40-52)



wherein R_2 is a hydrogen atom or methyl group, R_3 is a hydrogen atom or alkyl group having 1 to 10 carbons, and R_4 and R_5 are independently an alkyl group having 1-10 carbons (column 2, lines 53-

60) and in an amount of that is within 25-45 mol % (column 4, lines 59-61);

C. An acid generator (paragraph [0022]) in the amount of 1 –10 parts by weight (column 8, lines 41-44);

D. An alkali-soluble resin (copolymer (B) – column 5, lines 51-61)) such as a monomer of styrene, (meth)acrylic acid (Table 2 - Example 9) and hydroxyethyl (meth)acrylate (column 6, lines 3 – 8).

The recurring unit comprising the hydroxyethyl methacrylate is copolymerized to improve the pattern shape and resolution of the resist (column 5, lines 54-56). The amounts used are from 0 to 30% mol based on all of the recurring units (column 6, lines 10-13). Therefore, it would have been obvious to one of ordinary skill within the art at the time of the invention to include a copolymer of hydroxyethyl (meth)acrylate as disclosed by Iwanaga et al. within the photoresist of Fujimori et al. to improve the resolution and shape of the patterned resist.

Response to Arguments

5. Applicant's arguments, see pages 7-8, filed November 20, 2007, with respect to the rejection(s) of claim(s) 1 and 8 under 35 U.S.C. 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon

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further consideration, a new ground(s) of rejection is made in view of Fujimori et al (US 6,207,343).

6. Applicant's arguments see pages 9-11, filed November 20, 2007, with respect to the rejection(s) of claim(s) 1-5, 7, 9-11, 16-19 under U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

However, upon further consideration, a new ground(s) of rejection is made over Fujimori et al in view of Kawata et al (US 5,912,102). Fujimori et al in view of Kawata discloses the compound comprising the acetyl group as disclosed in applicant's claim 1 with the quinonediazide sensitizer of claim 1.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PONDER N. THOMPSON RUMMEL whose telephone number is (571)272-9816. The examiner can normally be reached on Monday-Friday 7:00 am - 4:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/P. N. T./
Examiner, Art Unit 1795

A handwritten signature in black ink, appearing to read 'Cynthia H. Kelly', with a stylized, cursive script.

CYNTHIA H. KELLY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700